Math 9 – Unit 2: Algebra One

Name: Date:

## Lesson 2.4: More Distributive Property and Powers of Monomials

Learning Goal: We are learning to expand and simplify more complicated expressions.

Let's start off by continuing our lesson on the Distributive Property. Take a look at the following questions:

Expand AND simplify (put your answers in descending order):

a) 
$$3x(4x^2-7x+2)+4x^2(2x-3)$$

$$= \frac{|2x^{3} - 2|x^{2} + 6x + 8x^{3} - |2x^{2}|}{|2x^{2} + 6x + 8x^{3} - |2x^{2}|}$$

$$= 20x^3 - 33x^2 + 6x$$

$$b)^{4}y^{2}(3y^{2}-5)-5y^{3}(6+y)$$

$$= -12y^{9} + 20y^{2} - 30y^{3} - 5y^{9}$$

$$= -17y^{9} - 30y^{3} + 20y^{2}$$

c) 
$$3mn^{(2m-7n)} - 5m^{2}(4n+8) + 6n^{2}(3m-n)$$
  
=  $6m^{a}n - 3lmn^{a} - 30m^{a}n - 40m^{2} + 18mn^{2} - 6n^{3}$   
=  $-14m^{a}n - 3mn^{a} - 40m^{a} - 6n^{3}$ 

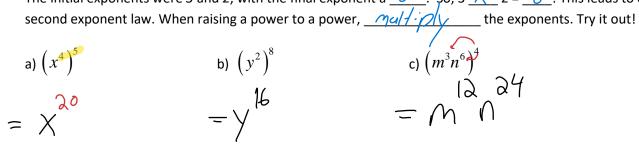
MTH1W

Now we are going to go back to discussing monomials. How do we simplify  $(3x^2y^5)^3$ ? This is called a monomial

raised to a power. How does the outside exponent affect the question? First, how does it work with just a number?

Simplify 
$$(4^3)^2 = 4^3 \times 4^3$$
  
=  $4^3 \times 4^3 \times 4$ 

The initial exponents were 3 and 2, with the final exponent a <u>6</u>. So, 3 <u>X</u> 2 = <u>6</u>! This leads to our



That's all well and good (hopefully), but how do you handle a question with a coefficient?

Consider the expression from before,  $(3x^2y^5)^3$ . Expand it without using the laws.

$$(3 \times^{2} \gamma^{5}) \times (3 \times^{2} \gamma^{5}) \times (3 \times^{2} \gamma^{5})$$
  
=  $27 \times^{6} \gamma^{5} \times 3^{3}$ 

The coefficient was just raised to the power of 3! Awesome. Try out some more, this time following the laws.

a) 
$$(2\frac{5}{x^{4}}\frac{y^{2}}{y^{2}})^{5}$$
  
b)  $((-3)m^{7}n^{9})^{2}$   $(2)$   $(-3)^{2}$   
 $= 32\frac{29}{x^{9}}\frac{10}{y^{9}}$   
 $= 7n^{19}n^{2}$   
 $= 7n^{19}n^{2}$   
 $= 15625\frac{12}{c^{4}}b^{7}\frac{c^{2}}{c^{2}}d^{30}$   
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$$\begin{array}{l} \text{MTHIW} \\ \text{d)} \left(3x^{2}y^{5}\right)^{2} (2xy^{3}) \\ = \left(9x^{4}y^{16}\right) \left(2x^{4}y^{3}\right) \\ & \text{mult}y \\ \end{array} \right) = \left(-64m^{3}n^{2}\right)^{3} \left(3m^{4}n^{3}\right)^{2} \\ = \left(-64m^{9}n^{6}\right) \left(9m^{6}n^{6}\right) \\ = \left(8x^{5}y^{13}\right) \\ = -576m^{17}n^{12} \end{array}$$

 $(16\chi^{2}\chi^{3}Z^{6}) = 1$ 3x2+5x-12)=(

25 x9 y3 =(2000×13×13)2 · · · =4000000×26×26

## Success Criteria:

- I can use the distributive property to multiply a polynomial with a monomial
- I can use the distributive property to combine multiple variables into a single term
- I can simplify a monomial raised to a power by multiplying the exponents of each variable
- I can recognize that when a coefficient is raised to a power, it is NOT NOT NOT multiplied
- I can understand that raising to the power of zero equals one.